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CHANGES IN STANDARD FREQUENCY BROADCASTS

Beginning on May 1, the following changes became effective in the standards of frequency and musical pitch broadcast from the Bureau's radio station WWV at Beltsville, Md.: (*a*) The frequency of 20 megacycles per second has been replaced by 15 Mc/sec; (*b*) announcements are given by voice only, not by telegraph keying; (*c*) announcements during the musical-pitch broadcasting are given every 5 instead of every 10 minutes; (*d*) the ionosphere bulletins have been discontinued.

The standard-frequency broadcasts now include: Standard radio frequencies; standard time intervals (seconds pulses); standard audio frequency; and standard musical pitch (440 c/sec). The last-named, and its carrier, a standard 5 Mc/sec, are broadcast continuously, day and night.

Those desiring full details should write to the National Bureau of Standards, Washington, D. C., for a copy of Letter Circular LC591, "Standard of Frequency and Musical Pitch Broadcast by National Bureau of Standards."

RADIO SOCIETIES' MEETINGS: IONOSPHERIC CHARACTERISTICS AND RADIO TRANSMISSION

At the meeting of the American Section, International Scientific Radio Union held at the National Academy of Sciences on April 26, J. H. Dellinger was elected chairman of the section. At the joint meeting of the section with the Institute of Radio Engineers, Dr. Dellinger and Newbern Smith presented a paper on the prediction of ionospheric characteristics.

The forecasting of monthly average values for ionospheric and radio conditions was undertaken at the Bureau last year. Beginning in the March 1939 issue of the Proceedings of the Institute of Radio Engineers, the Bureau has published each month, in addition to past observed values, predicted values for the month following that of publication. Because of the necessary lag in publication procedure, the predictions had to be made 3 months in advance.

A set of published predictions, as well as observed values, is now available for

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each month throughout a full year. Dr. Dellinger presented and compared these published predictions and observations and also presented some predictions of longer range for the future.

The monthly data were published in the form of graphs of maximum usable frequencies for dependable radio transmission via the regular layers, giving the monthly average values for undisturbed days, as a function of time of day and for various transmission distances. These graphs also predict critical frequencies and, implicitly, ionization densities of the F and F_2 layers (the number of electrons per cubic centimeter being 0.0124 times the square of the ordinary-wave critical frequency in kilocycles per second).

In announcing the service, the Bureau stated that predicted values were expected to have an accuracy within 15 percent, and the results show this to have been well met. The limit of accuracy is determined by the minor unpredictable variations of solar activity from its trend in the 11-year cycle.

At the same meeting, T. R. Gilliland and A. S. Taylor described their studies of the effect on the ionosphere of the annular solar eclipse of April 7. A portable ionosphere recorder was operated at Fort Clark, Tex., from April 5 to 15, and special measurements were made at Meadows, Md., on April 7. The results showed a definite drop of E-layer ionization approximately in phase with the eclipse and indicated a recombination coefficient of 10^{-8} or greater for the E layer. The decrease of F_2-layer ionization was not very definite and if present was small. The results indicated a recombination coefficient of 10^{-10} or less for F_2 layer.

MEETING OF HOROLOGICAL INSTITUTE OF AMERICA

The Horological Institute of America held its annual meeting in Washington on May 19 and 20. The society's headquarters were at the Raleigh Hotel, but the session on May 20, which was open to the public, took place at the National Academy of Sciences. I. H. Fullmer, of the Bureau, spoke on "The Precision of Mechanical Instruments," and Robert A. Franks, Jr., of the Franklin Institute, Philadelphia, Pa., presented a most interesting paper on "Prehistoric Time-Keeping in Central America."

Howard L. Beehler, of Lancaster, Pa., was elected president of the Institute. The secretary is Ralph E. Gould, chief of the Bureau's Time Section.

MEETING OF ACOUSTICAL SOCIETY OF AMERICA

The Acoustical Society of America held its twenty-third regular meeting at the Bureau on April 29 and 30, 1940. After the Acoustical Society Dinner at Wardman Park Hotel on April 29, the members visited the Navy Department's new model basin testing laboratory at Carderock, Md., where a special inspection tour had been arranged.

Thirty-six papers were presented at the meeting, including the following by members of the Bureau's staff: Absolute calibration of microphones, Richard K. Cook; Acoustical investigations of Joseph Henry as viewed in 1940, Wilbert F. Snyder; Dependence of sound transmission measurements on microphone position, Albert London; Effect of painting on the sound absorption of acoustical materials, V. L. Chrisler.

CONFERENCE OF STATE UTILITY COMMISSION ENGINEERS

The eighteenth annual conference of State Utility Commission Engineers was held at The Bureau on May 14 to 16, inclusive. The attendance was larger than at any previous conference, 59 delegates from 28 States and the District of Columbia being present.

The following papers were presented and discussed: Demand meter accuracies and applications, R. H. Nexsen, New York; Accuracies of watt-hour meters, F. A. Sager, District of Columbia; Electric service and meter rules, F. A. Wolff; National Bureau of Standards; The new National Electrical Safety Code, M. G. Lloyd, National Bureau of Standards; Electric rates, C. P. Dexter, Washington; Coordination of telephone and electric service, W. E. Limbocker, Kansas; Survey of rural electrification, including activities of the Rural Electrification Administration, J. H. Mathews, Illinois; Recent court and commission decisions, P. L. Holland, Maryland; Problems in transportation, W. E. Melvin, New Hampshire; Valuation methods, O. S. Vogel, Georgia; Establishment of continuing inventory records, N. K. Davis, Georgia.

Copies of these papers are not available at the Bureau. In some cases the authors may be able to supply copies; in any event, correspondence on the subject should be addressed to them.

The executive committee for the nineteenth conference, to be held at the Bureau in May 1941, is made up of: S. B. Nelson, Missouri, chairman; C. M.

Smith, New Hampshire, vice chairman; N. K. Davis, Georgia; H. J. Flagg, New Jersey; and V. G. Hunter, California. The secretary of the conference is J. Franklin Meyer, National Bureau of Standards, Washington, D. C.

SAFETY RULES FOR ELECTRIC FENCES

Electric fences that give a shock to an animal that touches them are rapidly coming into use on the farms of this country. To prevent serious accidents, electric fences must be supplied with current from a properly designed and constructed controller.

Safety rules regulating the use of electric fences constitute part 6 of the new edition of the National Electrical Safety Code. This is now available as Handbook H36. The regulations provide for the use of an adequate controller, for the marking of fences in public locations, and for the testing of equipment to see that it will fulfill the intended function.

Two States already regulate the sale and application of fence controllers, and others will probably follow their example, now that standard rules are available.

Copies of H36 are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents each.

ABSOLUTE STANDARD OF MUTUAL INDUCTANCE

In the Journal of Research for June (RP1302), Chester Snow derives a formula for the mutual inductance of two helical wires wound bifilarly in a single layer upon a cylindrical form. Terms are retained which are of the order of magnitude (relative to the principal term) of the square of the ratio of the pitch of the windings to the radius of the cylinder. Account is taken of the diameters of the two wires (which need not be equal), the current distribution, the axial component of current and the azimuth of the two windings, and also of the fact that the mean cylindrical radii of the primary and secondary may not be exactly the same nor the turns of the one exactly midway between those of the other.

PROPERTIES OF 2,2,4,4-TETRAMETHYLPENTANE

In connection with an investigation of paraffin hydrocarbons which the Bureau is conducting for the National Advisory Committee for Aeronautics, the Navy Bureau of Aeronautics, and the Army Air Corps, a sample of 2,2,4,4-tetramethylpentane was prepared synthetically and was purified by fractional distillation in an automatically controlled 6-meter, helix-packed column.

This highly branched paraffin was made by the interaction of dimethyl zinc and 2,2,4-trimethyl 4-chloropentane. Tetrahydronaphthalene was used as a solvent for the reactants.

The measured physical properties of this compound include freezing point, boiling point and its change with pressure, refractive index and density, and their variations with temperature.

The complete report of this work will be published as RP1306 by Frank L. Howard in the Journal of Research for June.

THICKNESS OF ACID-RESISTING PORTION OF PORCELAIN ENAMEL COATINGS

In applying porcelain enamel to sheet iron by the wet process, a non-acid-resistant coating is first used over the ground coat, and this is followed by an acid-resistant coating when required. Hence, it is not possible, by a mere determination of the total enamel thickness, to discover how heavy a coating of acid-resistant enamel has been applied. A knowledge of this factor is important for specification and inspection purposes and to assist the manufacturer in discovering and rectifying any undesirable variations in the thickness of the acid-resisting enamel. The following method was developed by L. Shartsis and W. N. Harrison:

1. Expose an oblique section of the enamel coating, at least 5 cm long and extending about 1 cm in width from the enamel surface to the iron, by grinding at approximately 5° to the surface of the enamel.

2. Mark the boundary between the original surface of the enamel and the oblique section with a material which will not disappear on refiring.

3. Measure accurately the approximate 1 cm width of the oblique section at several places.

4. Refire the specimen just sufficiently to give a fire polish to the oblique section.

5. Immerse the oblique section in an acid solution until the non-acid-resistant portion is etched; remove and dry.

6. Rub the entire oblique section with a colored wax china-marking pencil.

7. Rub the wax-coated oblique section with a dry cloth. This will remove the

wax from the acid-resistant portion of the section, but not from the portion etched by the acid.

8. Measure accurately the distance between the boundary marked as in (2) and the etched portion of the section referred to in (7) at the same places measured for step (3). The ratio of these averaged measurements to those of step (3) gives the fraction of the oblique section occupied by acid-resistant enamel. Multiply this fraction by the total enamel thickness determined with a gage. The product represents the thickness of the acid-resistant portion of the enamel layer.

While designed primarily for wet-process enamels, the method can also be used on dry-process enamels. Because the latter are usually thicker, the width of the oblique section should be about 2 cm instead of the 1 cm specified in paragraph 1.

Specimens were prepared on which acid-resistant enamels of known specific gravity were applied in known weights per unit area. Thicknesses determined by the method checked with the computed thicknesses, usually within 0.0005 inch.

CRITICAL COOLING RATE OF IRON-CARBON ALLOYS

In RP1308 by Thomas G. Digges, in the June Journal of Research, a method is described for heating small specimens of steel in vacuo and in an atmosphere of dry nitrogen to different temperatures and quenching directly in hydrogen. Determinations were made of the austenitic grain size and critical cooling rate of high-purity iron-carbon alloys ranging in carbon from 0.23 to 1.21 percent. These data show how carbon influences the austenitic grain size and critical cooling rate of the alloys, and make possible a direct comparison of the relation of austenitic grain size to critical cooling rate of hardenability.

CORROSION PITTING OF STEELS IN FRESH WATER

By examining surfaces and longitudinal sections of specimens of steel after stress corrosion, information has been obtained about the influence of cyclic stress (during corrosion) on the form and size of corrosion pits. In RP1307 by D. J. McAdam, Jr., and G. W. Geil, which will be published in the June number of the Journal of Research, a discussion is given of the theoretical stress concentration due to corrosion pits, and of the influence of size on the effective stress concentration.

By comparing typical views of corrosion pits with curves representing the decrease of the fatigue limit with corrosion time, the forms and sizes of the pits are correlated with the resultant lowering of the fatigue limit.

The stress corrosion process is discussed in terms of the general theory of corrosion of metals. With increase in cyclic stress and cycle frequency, the corrosion process is shifted from a cathodically controlled process toward an anodically controlled one.

CORROSION INHIBITORS FOR AIR-CONDITIONING EQUIPMENT

Rusting of iron or steel in air-conditioning systems, in which water is used, presents a serious problem. By treating the water with only a few parts of certain chemicals to a thousand parts of water and by the control of the hydrogen-ion concentration of the treated water so as to keep it slightly alkaline in character, the losses resulting from corrosion will be greatly decreased.

RP1305 by James H. Wilson and Edward C. Groesbeck, in the Journal of Research for June, describes a laboratory test devised to simulate the conditions experienced in an air-conditioning system. The losses resulting from corrosion were determined, using a number of different inhibiting chemicals under various conditions such as might occur in practice. It was found that the order of decreasing efficiency of the inhibitors studied was (*a*) chromates, (*b*) silicates, (*c*) phosphates, and (*d*) carbonates. The differences observed in the corrosion-resistance of the various kinds of iron and steel used were slight in comparison with the effect of a change of inhibitor or condition of test.

Corrosion in crevices, which is sometimes more severe than that occurring on an exposed surface, was also investigated. In those cases where only slight corrosion occurred, it was greater in crevices than on a plane surface, but in cases of severe corrosion, a crevice which is filled with liquid tends to fill up with corrosion products, thereby suppressing further action. In this latter case the losses from corrosion appear to be proportional to the available space within the crevice.

EQUIPMENT FOR AIR CONDITIONING OF MATERIALS

As part of an investigation of the drying of textiles, equipment was designed and built for the study of the moisture relations of materials in air of controlled relative humidities at elevated temperatures.

This equipment is described in detail in RP1303 by James G. Wiegerink in the June issue of the Journal of Research. The air is brought to the desired relative humidity and temperature by an arrangement including a saturator and automatically controlled heaters and is then passed through a working chamber in which the material to be studied can be weighed rapidly and accurately. Provision is made for measuring the rate of flow of air and for determining the relative humidity in the working chamber.

The equipment has been used at temperatures from 96° to 300° F, relative humidities from 10 to 90 percent for temperatures up to 212° F, and to the maximum relative humidities obtainable at atmospheric pressure for temperatures between 212° and 300° F. The temperature in the working chamber can be maintained constant within ±0.4° F and the relative humidity within ±1 percent relative humidity for experimental runs of several days' duration.

The equipment is of sufficient capacity for the study of 10 different materials simultaneously. It is large enough to accommodate samples to be tested in various ways after drying and to maintain a relatively large ratio of volume of air to volume of samples in order to insure uniform treatment through each sample and for the different samples. Provision is made for weighing the samples rapidly and conveniently while they are in the equipment at the desired relative humidity and temperature.

MOISTURE RELATIONS OF TEXTILE FIBERS AT ELEVATED TEMPERATURES

The moisture contents of 10 kinds of textile fibers were determined when the fibers were in equilibrium with air at different relative humidities and temperatures. Data were obtained for both "desorption" and "absorption," the yarns being brought to equilibrium from a wet condition and a dry condition, respectively. The temperatures ranged from 96° to 302° F and the relative humidities from about 5 to 90 percent for temperatures below 212° F, and up to the maximum obtainable at atmospheric pressure above 212° F.

The results are given in a paper by James G. Wiegerink (RP1304) in the June number of the Journal of Research in the form of graphs showing moisture content against relative humidity, and also as graphs in which the logarithms of the moisture contents at given relative humidities are plotted against the reciprocals of the corresponding absolute temperatures. The last show straight-line relationships with changes in the slopes of the lines between 200° and 200° F.

MICROSCOPIC EXAMINATION OF COTTON FIBERS IN CUPRAMMONIUM HYDROXIDE SOLUTIONS

Cuprammonium hydroxide solutions have a pronounced effect upon the cell walls of plants; for example, when cotton fibers are treated with this reagent, the bulk of the fiber appears to be dissolved, thereby producing a viscous solution from which cellulose can be precipitated. The solubility of cellulose under these conditions has been utilized in the manufacture of artificial textile fibers, and in the laboratory as a means of evaluating the quality of the fiber, especially as regards tensile strength.

Two different points of view are held concerning the behavior of cellulose fibers when treated with cuprammonium hydroxide solutions. According to one group of investigators the cellulose of the cotton fibers does not dissolve in the reagent but maintains a visible state of aggregation in the form of diminutive particles, each of which is surrounded by cementing material which swells in cuprammonium solutions, thereby giving rise to a gel-like structure upon which many of the characteristic properties of the dispersion depend. The other group has supported the view that cellulose is dissolved in cuprammonium hydroxide, and that properties of the solutions, such as viscosity, are functions of the chain-length of the cellulose molecule.

Since the above viewpoints lead to widely different interpretations of the behavior of cotton in this solution, it appeared advisable to undertake a new investigation of the microscopically ob-

servable changes which cotton fibers undergo in this reagent. The results of this study are given in a paper by Charles W. Hock and Milton Harris, of the research associateship maintained at the Bureau by the Textile Foundation; they are published as RP1309 in the June Journal of Research.

It was found that during the treatment of cotton with cuprammonium-hydroxide solutions, the cellulose dissolves, leaving residues which vary in amount and in structure, depending upon the degree of purification of the fibers. The undissolved residue from raw and from dewaxed fibers consists principally of fragmented shells which formed the outer surface of the fibers, and to a lesser extent of material from the lumen. Both of these residues are isotropic and stain deeply with ruthenium red. Fibers from which both wax and pectic substance have been removed dissolve in cuprammonium reagent, leaving only a very small amount of isotropic residue which exhibits no definite cytological structure.

With a steady flow of cuprammonium-hydroxide solution is applied to fibers mounted on a slide, the initial swelling of the fibers is followed by the appearance of small ellipsoidal particles which range from 1 to 2 μ in size, appear bright between crossed nicols, and become dark in color when stained with iodine and sulfuric acid. Identical particles appear, however, when cuprammonium-hydroxide solution is drawn under the coverglass, in the absence of fibers. These particles, which result from the exposure of the cuprammonium-hydroxide reagent to the air, are then washed under the coverglass where they become intimately associated with the fiber residue. Formation of these particles may be prevented by using a specially constructed cell which prevents exposure of the reagent. Under these conditions, no particles were observed during the slow passage, even for prolonged periods, of the cuprammonium reagent over the cotton fibers.

WOOD-FRAME WALL AND PARTITION CONSTRUCTIONS USING "CELOTEX" INSULATING BOARDS

Tests of 42 specimens of wood-frame wall and partition constructions using sheathing, building board, and insulating lath, manufactured from sugarcane by the Celotex Corporation, are described in Building Materials and Structures Report BMS42 recently released. Specimens of this construction were subjected to loads simulating those in an actual house and the results are presented in convenient graphical and tabular form.

Copies of the report are obtainable at 10 cents each from the Superintendent of Documents, Government Printing Office, Washington, D. C.

SURFACE TREATMENT OF STEEL PRIOR TO PAINTING

Surface treatment processes for application to plain and galvanized steel before painting are described in Building Materials and Structures Report BMS44 which has just been released. The results of accelerated laboratory corrosion tests, designed to determine the relative effect of these treatments in improving the protective value of paints, are discussed. Comparison of results is limited to the tests themselves, and conclusions are drawn on the basis of factors affected by conditions peculiar to the individual test.

Among the treatments subjected to accelerated weathering, salt spray, and condensation corrosion tests, the hot-dip phosphate treatments for both plain and galvanized surfaces showed outstanding merit in improving the protective value of paints. Particularly effective protection was obtained when such treatments were used in combination with a primer of the inhibitive type. A phosphate cold wash for galvanized steel and two phosphate-chromate coldwash treatments for plain steel also appeared to improve paint protection.

The present report, copies of which are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each, is the first of a series in which it is proposed to discuss the results of laboratory corrosion tests and supplementary outdoor-exposure tests of surface treatments for the corrosion protection of plain and galvanized sheet steel.

COMMERCIAL STANDARDS FOR FUEL OILS

A new edition of Commercial Standard CS12, Fuel Oils, is now available. Copies are obtainable from the Super-

intendent of Documents, Government Printing Office, Washington, D. C., at 5 cents each. The present (fifth) edition reduces the pour-point temperatures for grades 1 and 2 and reduces the maximum viscosity of grades 3 and 5 to provide oils with improved characteristics from the users' standpoint. The standard became effective for new production on January 5, 1940, subject to the expiration of existing contracts.

NEW AND REVISED PUBLICATIONS ISSUED DURING MAY 1940

Journal of Research [2]

Journal of Research of the National Bureau of Standards, volume 24, number 5, May 1940 (RP1295 to RP1301, inclusive). Price, 30 cents. Annual subscription, 12 issues, $3.50.

Research Papers [2]

RP1273. Application of vibrators for measuring mortar consistency and fabricating mortar cubes. Raymond L. Blaine and John Tucker, Jr. Price, 10 cents.

RP1274. Alpha and beta methyl lyxosides, mannosides, gluosides, and heptosides of like configuration. Horace S. Isbell and Harriet L. Frush. Price, 10 cents.

RP1275. First spectrum of tin. William F. Meggers. Price, 10 cents.

RP1276. Reaction of bromine with furfural and related compounds. Elizabeth E. Hughes and S. F. Acree. Price, 5 cents.

RP1277. Structure of difructose anhydride III (difructo-furanose 1,2′, 2,3′-anhydride). Emma J. McDonald and Richard F. Jackson. Price, 5 cents.

RP1278. Stability of base-metal thermocouples in air from 800° to 2,200° F. Andrew I. Dahl. Price, 5 cents.

RP1279. Predictions of normal radio critical frequencies related to solar eclipses in 1940. Newbern Smith. Price, 5 cents.

RP1280. Boiling points of *n*-heptane and 2,2,4-trimethylpentane over the range 100- to 1,500-millimeter pressure. Edgar Reynolds Smith. Price, 5 cents.

RP1281. Dielectric constant, power factor, and resistivity of marble. Arnold H. Scott. Price, 5 cents.

RP1282. Reducing powers of various sugars with alkaline copper-citrate reagent. Horace S. Isbell, William W. Pigman, and Harriet L. Frush. Price, 5 cents.

RP1284. Second ionization constant and related thermodynamic quantities for malonic acid from 0° to 60° C. Walter J. Hamer, John O. Burton, and S. F. Acree. Price, 5 cents.

RP1285. Hue, saturation, and lightness of surface colors with chromatic illumination. Deane B. Judd. Price, 10 cents.

RP1286. Combination of wool protein with acid and base: Hydrochloric acid and potassium hydroxide. Jacinto Steinhardt and Milton Harris. Price, 10 cents.

Handbooks [2]

H36. Safety rules for electric fences. (Comprising part 6 of the fifth edition of the National Electrical Safety Code.) Price, 5 cents.

Building Materials and Structures Reports [2]

[Persons who wish to be notified of new publications in the Building Materials and Structures series as soon as they are available should write to the Superintendent of Documents, Government Printing Office, Washington, D. C., asking that their names be placed on the special mailing list maintained by him for this purpose.]

BMS42. Structural properties of wood-frame wall and partition constructions with "Celotex" insulating boards sponsored by the Celotex Corporation. Herbert L. Whittemore and Ambrose H. Stang with the collaboration of Thomas R. C. Wilson, Forest Products Laboratory. Price, 10 cents.

BMS44. Surface treatment of steel prior to painting. Rolla E. Pollard and Wilbur C. Porter. Price, 10 cents.

Commercial Standards [2]

CS12–40. Fuel oils. (Supersedes CS12–38.) Price, 5 cents.

CS79–39. Blown, drawn, and dropped lenses for sun glasses. Price, 5 cents.

Miscellaneous Publications [2]

M165. Standardization of packages. (Reprinted from Miscellaneous Publication M164.) Price, 10 cents.

[2] Send orders for publications under this heading only to the Superintendent of Documents, Government Printing Office, Washington, D. C. Subscription to Technical News Bulletin, 50 cents per year: Journal of Research, $3.50 per year (to addresses in the United States and its possessions, and in countries extending the franking privilege); other countries, 70 cents and $4.50, respectively.

MIMEOGRAPHED MATERIAL

Letter Circulars

[Letter Circulars are prepared to answer specific inquiries addressed to the National Bureau of Standards and are sent only on request to persons having definite need for the information. The Bureau cannot undertake to supply lists or complete sets of Letter Circulars or send copies automatically as issued.]

LC584. Standard specifications for sieves. (Supersedes LC74.)

LC586. List of publications of interest to the general public. (Supersedes LC416.)

LC587. Ceramics (miscellaneous): Publications by members of the staff of the National Bureau of Standards, together with a list of Federal specifications and standard samples.

LC589. List of commercial standards, revised to April 10, 1940. (Supersedes LC579.)

LC490. Simplified practice, its purpose and application. (Supersedes LC456.)

LC591. Standards of frequency and musical pitch broadcast by National Bureau of Standards. (Supersedes LC565.)

LC592. Building materials, building standards, home building: Publications of the National Bureau of Standards. (This list has been prepared for the use of architects, engineers, building officials, and others.) (Supersedes LC290 and supplement thereto.)

LC593. Weights and measures: National Bureau of Standards publications of general interest. (Supersedes LC562.)

LC594. List of simplified practice recommendations, revised to May 15, 1940. (Supersedes LC582.)

RECENT BUREAU ARTICLES APPEARING IN OUSTIDE PUBLICATIONS [3]

Revision of electrical units. E. C. Crittenden. Electrical Engineering (33 West 39th St., New York, N. Y.) 59, 160 (April 1940).

Flame speeds and energy considerations for explosions in a spherical bomb. Ernest F. Fiock, Charles F. Marvin, Jr., Frank R. Caldwell, and Carl H. Roeder. Nat. Advisory Com. Aero. Tech. Rep. 682 (National Advisory Committee for Aeronautics, Washington, D. C.) (April 1940). (Obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents a copy.)

A photoelectric cell for measuring ultraviolet solar and sky radiation on a horizontal plane. W. W. Coblentz and R. J. Cashman. Bul. Am. Meteorological Soc. (Blue Hill Observatory, Milton, Mass.) 21, 149 (April 1940).

Concerning the existence of fractions in the sericin of raw silk. Henry A. Rutherford and Milton Harris. Textile Research (65 Franklin St., Boston, Mass. 10, 221 (April 1940).

Plastics and their uses in the automotive industry. Gordon M. Kline. Soc. Automotive Engineers J. (29 West 39th St., New York, N. Y.) 46, 198 (May 1940).

[3] These publications are not obtainable from the Government unless otherwise stated. Requests should be sent direct to publishers.

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